

TECHNICAL MEMORANDUM ON UTILITY RELOCATIONS

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HONOLULU HIGH-CAPACITY TRANSIT CORRIDOR ALTERNATIVES ANALYSIS / DRAFT ENVIRONMENTAL IMPACT STATEMENT

prepared for:
City and County of Honolulu

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Technical Memorandum on Utility Relocations Honolulu High-Capacity Transit Corridor Project

May 14, 2006

Prepared for:
City and County of Honolulu
and
Federal Transit Administration

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Acronyms Used in this Document

AA	Alternatives Analysis
CSC	Composite Section Costs
ENR	Engineering News-Record
FTA	U.S. Department of Transportation Federal Transit Administration
HDOT	State of Hawai‘i Department of Transportation
HECO	Hawaiian Electric Company
HT	Hawaiian Telcom
LPA	Locally Preferred Alternative
MK	MK Engineers, Ltd.
rf	Route foot
SCC	Standard Cost Categories
TW	Time Warner Cable
UH	University of Hawai‘i

Purpose of This Memorandum

This memorandum has been prepared to present and summarize a preliminary utility survey done to assist in estimating potential utility relocation costs associated with the “build” transit alternatives being considered during the Alternatives Analysis phase of the project.

Utility Survey Methods

Public Utilities

The exact location of all public utilities, including storm drain, sanitary sewer, and water, along all Alternative alignments was not established. The location of public utilities along the previously planned 1992 transit system had been well cataloged by the City and County of Honolulu during that planning effort. The 1992 transit system alignment (from Waiawa to UH-Mānoa) was fairly similar to some of the current Alternative 4 Fixed Guideway alignments (Kamehameha Highway from Waiawa to Pearl Harbor, makai side of Nimitz Highway from Pearl Harbor to Keehi, Dillingham Boulevard through Kalihi, Nimitz Highway through downtown, Halekauwila Street/Waimanu Street/Kona Street/Kapi‘olani Boulevard/University Avenue from downtown to UH-Mānoa). Generally, the location and density of public utilities has not changed significantly since 1992; however, PB added known significant additions within the area since the 1992 study.

Although not a public utility, this process also included natural gas and other fuel lines.

The density of public utilities along the 1992 transit system alignment was deemed representative of the current density along all current Alternative alignments. An exhaustive study of public utilities along all possible current Alternative alignments was not deemed necessary for this level of screening and cost estimating.

Private Utilities

MK Engineers, Ltd. (MK) managed the assessment of private utilities, including electrical, telephone, and cable TV, on behalf of PB. MK met with Hawaiian Electric Company (HECO), Hawaiian Telcom (HT), and Time Warner Cable (TW); reviewed drawings provided by those utility operators; and performed field observations along the transit alignments to establish the location of private utilities in the project area. A report summarizing MK’s findings is attached in Appendix A.

Utility Relocation Cost Estimating Methods

The methods presented here were used to estimate the cost associated with relocating utilities, both removing existing and installing new, within the various transit alternative alignments.

Public Utilities

First, PB estimated the cost to relocate all the public utilities identified along the 1992 transit system route. That was done using unit costs developed from HDOT cost data or other historical sources from other systems throughout the country. When cost data from sources outside of Hawaii were used, an adjustment may have been made using historic state adjustment factors such as those used in the US Army Corps of Engineers Civil Works Construction Cost Index System. Unit costs included items such as “Sawcut Asphalt Pavement,” “Haul & Dispose 12 cy dump 20 mil RT,” “Water Pipe up to 8 Inch,” and “Aggregate Base.” Those unit costs were in 4th quarter 2006 dollars and were applied to all necessary public utility replacement projects along the 1992 corridor to generate a total cost for:

- The reinstallation of public utilities requiring relocation, \$6,154,090
- The removal of public utilities relocated, \$4,087,000

Those two costs were then divided by the total length of the 1992 transit system alignment, 81,740 feet, to calculate:

- The cost to reinstall public utilities per route foot of alignment, \$75.00
- The cost to remove public utilities per route foot of alignment, \$50.00

Those two general unit costs were then turned into composite section costs (CSC), which were used in the overall capital cost estimates. CSC 40.02-1, “Utilities based on 1992 information,” took the cost to reinstall public utilities, \$75 per route foot, and added a 2 percent fee for maintenance of traffic and 6 percent fee for mobilization/demobilization to generate a cost of \$81.00 per route foot. CSC 40.02-7, “Utility: removals,” took the cost to remove public utilities, \$50 per route foot, and also added a 2 percent fee for maintenance of traffic and 6 percent fee for mobilization/demobilization to generate a cost of \$54.00 per route foot.

CSC 40.02-1 and 40.02-7 are then carried forward to all Alternative 3 and 4 alignments and multiplied by the route length of each alignment to account for public utility work required. For example, the Alternative 3 Managed Lane reversible option alignment has a route length of 75,018 feet; therefore the cost to reinstall public utilities along the alignment is \$6,076,458 and the cost to remove relocated public utilities is \$4,050,972. Those public utility costs, plus private utility costs (discussed below), are wrapped up in the CSC 40.02 “Site Utilities, Utility Relocation.” The utility costs are further wrapped up in the overall standard cost category (SCC) 40.00 “Sitework & Special Conditions” of the overall capital cost estimate.

Private Utilities

MK developed costs for private utility work per Alternative 3 and 4 alignments, down to the section level (i.e. Section IV Dillingham Boulevard alignment). PB imported the MK cost estimates into the CSC system, creating a separate CSC for each alignment (i.e. CSC 40.02-12 “Section 2: Electrical & Communication- Farrington Blvd.”) Each of these steps is discussed in more detail below.

MK Cost Estimate

MK developed unit costs based on information obtained from the utility companies and from their internal data base. MK's cost estimated method is detailed in their report provided in Appendix A. Generally, MK:

- Generated unit costs for the variety of utilities that crossed or are parallel to the alignments, including:
 - 138 kV transmission system
 - 46 kV sub-transmission system
 - 4 and 12 kV class distribution system
 - Telecommunications system – copper cables
 - Telephone cable – fiber optic cable
 - Cable television cable – coaxial cable
 - Cable television system – fiber optic cable
- Assumed overhead utilities crossing the path of the transit line would be relocated underground unless there is adequate clearance below the lowest overhead conductor.
- Assumed underground utility lines closely paralleling the transit line would be relocated underground.

PB CSC Process

PB imported the MK cost estimates into the overall capital cost estimate process. The MK cost estimate for each alignment was imported as a lump sum unit cost (items 13000##). PB added 5 percent for general contractor mark up on subcontractors to the MK cost estimates prior to importing them as unit costs. PB then generated CSCs for private utility costs on each alignment (i.e. CSC40.02-9 "Section 1: Electrical & Communication- Kamokila Boulevard"). At this step PB made the following modifications:

- Reduced the alignment private utility unit costs by 10 percent due to duplicate costs in other standard cost categories (SCC). For example, site preparation and resurfacing are provided for in other SCCs. This was done for all alignments except the Nimitz Highway/Halekauwila Street/Kapi‘olani Boulevard alignment because this step was done prior to inputting the unit cost in this instance.
- Reduced the alignment private utility unit costs by an additional 15 percent to account for cost sharing by the private utilities.
- Dropped some utility costs MK identified because the fixed guideway structure will be engineered so as to avoid some of the utility relocations identified by MK, including:
 - \$16,662,300 worth of MK estimates for Farrington Highway in Section II (FG 26 and 27).

- \$100,000,000 worth of MK estimates for Kona Street in Section V. This reduction was actually done prior to importing the MK cost estimate as a unit cost.

Similar to the public utility CSCs, the CSCs for private utilities (40.02-8 through 40.02-69) are then carried forward to all Alternative 3 and 4 alignments. The private utility CSCs are lump sum estimates instead of unit costs as in the case of the public utilities. Therefore, as they are carried forward they are not multiplied by the length of the alignment. The private utility costs, plus public utility costs (discussed above), are wrapped up in the CSC 40.02 “Site Utilities, Utility Relocation.” The utility costs are further wrapped up in the overall standard cost category (SCC) 40.00 “Sitework & Special Conditions” of the overall capital cost estimate.

Chapter 2

Summary of Utility Costs

The utility relocation cost estimates for Alternative 3, the Managed Lane Alternative, and Alternative 4, the Fixed Guideway Alternative, are presented in Table 2-1 below. The MK report that estimates cost related to the relocation of private utilities is provided in Appendix A; however, it should be remembered that PB made some modifications (discussed in Chapter 1) to the MK estimates prior to incorporating them into the broader capital cost estimates. When these utility costs were incorporated into the capital cost estimates they were placed in CSC 40.02. The capital cost estimate that is presented in the Alternatives Analysis includes a 35 percent contingency on utility construction costs.

Table 2-1 summarizes the utility costs calculated for Alternatives 3 and 4 and for each alignment within those alternatives. The costs are expressed in 4th quarter 2006\$ with no contingency, escalation, or finance charges.

Table 2-1. Summary of Utility Cost Estimates

Alternative/Section	Align- ment Length (feet)	Public Utility Relocation (2006\$)	Public Utility Removal (2006\$)	MK Cost Estimate (2006\$)	PB Unit Cost (13000##) (2006\$)	PB CSC Cost (CSC40.02- ##) (2006\$)	Total Utility Costs (2006\$)
Alternative 3: Managed Lane Alternative							
Reversible Option	83,112	\$6,076,458	\$4,050,972	\$138,761,013	\$145,700,000	\$109,275,000	\$119,402,430
Two-way Option	85,440	\$6,076,458	\$4,613,760	\$138,761,013	\$145,700,000	\$109,275,000	\$119,965,218
Alternative 4: Fixed Guideway Alternative							
Section I. Kapolei to Fort Weaver Road							
Kamokila Boulevard/ Farrington Highway (partial at-grade)	32,421	\$2,626,101	\$1,750,734	\$14,808,000	\$15,548,400	\$11,661,300	\$16,038,135
Kapolei Parkway/ North-South Road (partial at-grade)	38,186	\$3,093,066	\$2,062,044	\$12,877,250	\$13,521,113	\$10,140,835	\$15,295,945
Saratoga Avenue/ North-South Road (partial at-grade)	47,473	\$3,845,313	\$2,563,542	\$18,083,875	\$19,892,263	\$14,919,197	\$21,328,052
Geiger Road/ Fort Weaver Road (partial at-grade)	47,065	\$3,812,265	\$2,541,510	\$10,902,625	\$11,447,756	\$8,585,817	\$14,939,592
Section II. Fort Weaver Road to Aloha Stadium							
Farrington Highway/ Kamehameha Highway	35,574	\$2,881,494	\$1,920,996	\$35,925,375	\$37,721,644	\$12,628,933	\$17,431,423
Section III. Aloha Stadium to Middle Street							
Salt Lake Boulevard (to North King Street)	25,375	\$2,055,375	\$1,370,250	\$20,406,108	\$21,426,413	\$16,069,810	\$19,495,435
Salt Lake Boulevard (to Dillingham Boulevard)	24,972	\$2,022,732	\$1,348,488	\$19,669,481	\$20,652,955	\$15,489,716	\$18,860,936
Mauka of the Airport Viaduct (at grade/elevated)	26,999	\$2,186,919	\$1,457,946	\$140,487,922	\$147,512,318	\$110,634,239	\$114,279,104
Mauka of the Airport Viaduct (fully elevated)	26,999	\$2,186,919	\$1,457,946	\$28,430,022	\$29,851,523	\$22,388,642	\$26,033,507
Makai of Airport Viaduct	27,224	\$2,205,144	\$1,470,096	\$115,487,922	\$121,262,318	\$90,946,739	\$94,621,979
Aolele Street	28,501	\$2,308,581	\$1,539,054	\$27,436,259	\$28,808,072	\$21,606,054	\$25,453,689

Alternative/Section	Align- ment Length (feet)	Public Utility Relocation (2006\$)	Public Utility Removal (2006\$)	MK Cost Estimate (2006\$)	PB Unit Cost (CSC40.02- ##)	PB CSC Cost (CSC40.02- ##)	Total Utility Costs (2006\$)
Section IV. Middle Street to Iwilei							
North King Street (from Nimitz Highway)	11,931	\$966,411	\$644,274	\$62,380,000	\$65,499,000	\$49,124,250	\$50,734,935
North King Street (from Salt Lake Blvd.)	8,757	\$709,317	\$472,878	\$62,000,000	\$65,100,000	\$48,825,000	\$50,007,195
Dillingham Boulevard	8,793	\$712,233	\$474,822	\$90,100,000	\$94,605,000	\$70,953,750	\$72,140,805
Section V. Iwilei to UH Mānoa							
From North King Street							
Hotel Street/ Kawaihaʻo Street/ Kapiʻolani Boulevard	24,051	\$1,948,131	\$1,298,754	\$269,663,714	\$178,146,900	\$133,610,175	\$136,857,060
Hotel Street/ Waimanu Street/ Kapiʻolani Boulevard	23,653	\$1,915,893	\$1,277,262	\$251,880,607	\$159,474,637	\$119,605,978	\$122,799,133
King Street Tunnel/ Waimanu Street/ Kapiʻolani Boulevard	23,657	\$1,916,217	\$1,277,478	-	\$218,945,054	\$164,208,791	\$167,402,486
Nimitz Highway/ Queen Street/ Kapiʻolani Boulevard	24,331	\$1,970,811	\$1,313,874	\$252,792,603	\$160,432,233	\$120,324,175	\$123,608,860
Nimitz Highway/ Halekauwila Street/ Kapiʻolani Boulevard	24,569	\$1,990,089	\$1,326,726	\$270,490,180	\$179,014,689	\$152,162,486	\$155,479,301
Beretania Street/ South King St.	20,539	\$1,663,659	\$1,109,106	\$76,189,197	\$79,998,657	\$61,198,973	\$63,971,738
From Dillingham Boulevard							
Hotel Street/ Kawālahāʻo Street/ Kapiʻolani Boulevard	24,260	\$1,965,060	\$1,310,040	\$271,776,227	\$180,365,038	\$135,273,779	\$138,548,879
Hotel Street/ Waimanu Street/ Kapiʻolani Boulevard	23,862	\$1,932,822	\$1,288,548	\$253,993,120	\$161,692,776	\$121,269,582	\$124,490,952
King Street Tunnel/ Waimanu Street/ Kapiʻolani Boulevard	24,290	\$1,967,490	\$1,311,660	-	\$221,163,193	\$165,872,395	\$169,151,545
Nimitz Highway/ Queen Street/ Kapiʻolani Boulevard	24,355	\$1,972,755	\$1,315,170	\$253,712,209	\$161,397,819	\$121,048,364	\$124,336,289
Nimitz Highway/ Halekauwila Street/ Kapiʻolani Boulevard	24,593	\$1,992,033	\$1,328,022	\$271,409,786	\$179,980,275	\$152,983,234	\$156,303,289
Beretania Street/ South King St.	21,209	\$1,717,929	\$1,145,286	\$78,199,710	\$82,109,696	\$62,813,917	\$65,677,132
Waikīki Spur	8,166	\$661,446	\$440,964	\$75,475,542	\$79,249,319	\$60,625,729	\$61,728,139

Appendix A

MK Engineers, Ltd. Report, August 4, 2006

MK Engineers, Ltd.

August 4, 2006

HONOLULU HIGH CAPACITY TRANSIT CORRIDOR ALTERNATIVES
ANALYSIS (AA) – ELECTRICAL, TELECOMM & CABLE SYSTEMS
RELOCATION

A. SCOPE OF SERVICES: MK Engineers, Ltd. (MKE) was responsible for development of concept cost estimates for the relocations of electrical and telecommunications infrastructure that may be affected by each of the transit corridor alternatives under consideration. This narrative describes the basis and methodology for development of the cost estimates.

B. METHODOLOGY

1. Meetings with the utility companies, Hawaiian Electric Company (HECO), Hawaiian Telcom (HT) and Time Warner Cable (TW), were held. Each utility was given an overview of the project along with a map showing the transit corridor alternatives, and were requested to provide maps that show utility company infrastructure that cross or parallel the routes.
2. Field observations were made of each corridor segment under consideration to identify the general location and type of utility where such were visible.
3. The routing drawings, field observations, and maps obtained from the utility companies were used to identify the lines along each segment that would require relocation because of interference or conflict with the transit line. The type and quantity of relocations for each segment were developed in this step.
4. Unit costs were developed from information obtained from the utility companies and from MKE's internal data base. Unit costs were developed for various typical types of utility relocation work including crossings of the transit line and parallel relocations. Systems for which typical transverse crossing relocations and parallel relocations for overhead and underground conditions were developed. These included:
 - a. 138 kV transmission system
 - b. 46 kV sub-transmission system
 - c. 4 and 12 kV class distribution system
 - d. Low voltage secondary distribution system
 - e. Telecommunications system – copper cables
 - f. Telephone cable – fiber optic cable
 - g. Cable television cable – coaxial cable
 - h. Cable television system – fiber optic cable
5. Unit costs were applied to the quantities derived identified in Step 4 above and extended to obtain the cost for utility relocations in each transit segment.

C. ASSUMPTIONS

1. Overhead utility lines crossing the path of the transit line will be relocated unless there is adequate clearance below the lowest overhead conductor. Relocations will typically be underground.
2. Underground utility lines closely paralleling the transit line will be relocated. Relocations will typically be underground.

D. UTILITY COMPANY COST CONTRIBUTIONS – HECO, HT, and TW were asked whether they would contribute funds for the relocation of their facilities. None of them were able to provide a firm answer about his. It is assumed that the cost of utility relocations will be borne by the respective utilities as provided by Section 264-33 of the Hawaii Revised Statutes under Utility Agreements between the City and the utility companies. In general, under the Utility Agreement format, the City and the respective utility companies will share in the relocation costs of overhead to overhead or underground to underground relocations less salvage and depreciation costs. Other factors such as utilities located in easements, utilities located on fee simple lands, overhead to underground relocations, utility betterments, etc., will also impact the outcome of the cost sharing agreements.

E. SECTION 1 SEGMENT UTILITY RELOCATION COMMENTS

1. Kamokila Blvd- Farrington Highway Segment - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as relocation of an existing underground 25KV ductline along Farrington Highway from Fort Barrette Road to the Kapolei Golf Course.
2. Kapolei Pkwy - North-South Rd - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as an overhead relocation of a section of double circuit 138KV steel pole line along the North-South Road.
3. Saratoga Ave - North-South Rd - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as an overhead relocation of a section of double circuit 138KV steel pole line along the North-South Road.
4. Geiger Rd - Fort Weaver Rd - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings.

F. SECTION 2 SEGMENT UTILITY RELOCATION COMMENTS

1. Farrington Highway – Kamehameha Highway - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as underground relocation of 138KV overhead lines at the Waiawa Interchange and at the HECO Waiau Power Plant.

G. SECTION 3 SEGMENT UTILITY RELOCATION COMMENTS

1. Salt Lake Blvd - N King St. - Relocation work in this segment is primarily limited to relocation of existing overhead 138 KV, 46 KV, 4/12KV, and telecommunications crossings. It also includes the relocation of existing street lighting or lighting within parking areas such as at Aloha Stadium. Also, the existing 138 kV and 46 kV overhead lines along Salt Lake Boulevard fronting the Stadium come into conflict with portions of the elevated rail and therefore need to be relocated or placed underground. The section between Mokumoa Street to N. King Street parallels the freeway and involves the relocation of existing street lights.
2. Salt Lake Blvd - Dillingham Blvd – This section is similar to the Salt Lake Blvd to N. King Street above. The section from Mokumoa Street to

Dillingham runs through the Shafter Flats area and crosses a 138 KV/46KV line and may impact existing Army primary distribution facilities.

3. Mauka side of Airport Viaduct – The section between Aiea Access Road to 6th Center Drive consist of relocation of existing overhead 138 KV, 46 KV, 4/12KV, and telecommunications crossings along Kamehameha Highway. The one station in the parking lot of the Aloha Stadium is in the location of extensive Hawaiian Telcomm underground infrastructure. This estimate assumes that this infrastructure will have to be relocated. Also, the existing 138 KV and 46 KV overhead lines along Kamehameha Highway fronting the Stadium come into conflict with portions of the elevated rail and therefore need to be relocated or placed underground. A 138 KV transmission line runs on the mauka side of the viaduct. The clearance between the viaduct and the lines varies and in some cases is fairly close. This estimate assumes that the clearance is not adequate for the new rail. Therefore, the estimate assumes placing the overhead section of lines underground. On the mauka side of the 138 KV lines is a Navy owned 12 KV overhead system. This estimate assumes that this segment of line will also have to be relocated underground. The cost for this segment is the same for both the elevated and the at-grade conditions except that the at-grade condition includes the cost to relocate the HECO Airport Switching Station.
4. Makai side of Airport Viaduct – The section between Aiea Access Road and 6th Center Drive is similar to the Mauka side of Airport Viaduct above. The work along the Makai side of the freeway includes various 138 KV and 46 KV crossings and relocation of riser poles. Most of the infrastructure on this side is under the viaduct structure.
5. Aolele St - The section along Aolele Street consists of relocation of existing lights and underground telecommunications facilities. The lighting includes street lights as well as lighting within the Airport parking lot. The underground telecommunications relocation work is at the proposed station at Aolele and Lagoon Drive. This estimate doesn't include any relocation costs within the Airport parking lot (other than lighting) because it is not known if the new rail will impact any existing secondary distribution on Airport property.

H. SECTION 4 SEGMENT UTILITY RELOCATION COMMENTS

1. Nimitz Hwy - N. King St - Relocation work in this segment is assumed to be limited to the replacement of the existing street lighting system on the ewa side of Middle Street.
2. Salt Lake Blvd - N. King St. - Relocation work along King Street will include multiple 138KV, 46KV, 4/12KV, and telecommunication line crossings as well as under grounding of the existing utility lines where the lines are running parallel to the proposed alignment and are found to be in conflict with the proposed transit pathway.
3. Dillingham Blvd - Relocations in this segment will include multiple 138KV, 46KV, 4/12KV, and telecommunication line crossings as well as under grounding of the existing utility lines where Dillingham Boulevard is to be widened. It is assumed that the existing 138KV overhead circuit will not have

to be relocated as it is currently installed at the edge of the existing right-of-way. It is assumed that the proposed transit pathway will not pass directly over HECO's Iwilei Substation, but will run just at the outskirts of the substation fencing. This will require the relocation of all circuits entering the substation along the transit pathway route and the modification of the substation equipment to accept the new connections to the relocated circuits. Special construction methods will be required in order to work in close proximity to the live, exposed electrical equipment..

I. SECTION 5 SEGMENT UTILITY RELOCATION COMMENTS

1. North King St/Hotel St/Kawaiahao St/Kapiolani Blvd - Relocations include: Underground low-voltage network distribution system along Hotel Street in Chinatown; over 100 telephone ducts between Bishop and Alakea; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
2. Dillingham Blvd/Hotel St/Kawaiahao St/Kapiolani Blvd – Relocations include: Underground low-voltage network distribution system along Hotel Street in Chinatown; over 100 telephone ducts between Bishop and Alakea; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
3. North King St/Hotel St/Waimanu St/Kapiolani Blvd – Relocations include: Underground low-voltage network distribution system along Hotel Street in Chinatown; over 100 telephone ducts between Bishop and Alakea; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
4. Dillingham Blvd/Hotel St/Waimanu St/Kapiolani Blvd – Relocations include: Underground low-voltage network distribution system along Hotel Street in Chinatown; over 100 telephone ducts between Bishop and Alakea; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station;

- 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
5. North King St/Nimitz Hwy/Queen St/Kapiolani Blvd – Relocations include: Four 46KV transmission lines along Nimitz between River Street and the Downtown Power Plant; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
 6. Dillingham Blvd/Nimitz Hwy/Queen St/Kapiolani Blvd - Relocations include: Four 46KV transmission lines along Nimitz between River Street and the Downtown Power Plant; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
 7. North King St/Nimitz Hwy/Halekauwila St/Kapiolani Blvd - Relocations include: Four 46KV transmission lines along Nimitz between River Street and the Downtown Power Plant; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
 8. Dillingham Blvd/Nimitz Hwy/Halekauwila St/Kapiolani Blvd - Relocations include: Four 46KV transmission lines along Nimitz between River Street and the Downtown Power Plant; 138KV and four 25KV underground transmission lines between the Kewalo and Kamoku Sub-stations along Kona Street and Kapiolani Blvd; twelve 12KV underground distribution lines along Kona and Keaumoku Streets; relocation of submersible transformer vaults located along the new Ala Moana station; 46KV overhead transmission line along University Avenue; major telephone and CATV relocation along Kona Street, Kapiolani Blvd and University Avenue.
 9. North King St/Beretania St/South King St – Relocations include: Underground low-voltage network distribution system in Chinatown at the Beretania/Ft. Street Station; Two 138KV underground transmission lines near Alapai Street and Archer Lane; eight 46KV overhead transmission lines crossing King Street and University Avenue.
 10. Dillingham Blvd/Beretania St/South King St - Relocations include: Underground low-voltage network distribution system in Chinatown at the

Beretania/Ft. Street Station; Two 138KV underground transmission lines near Alapai Street and Archer Lane; eight 46KV overhead transmission lines crossing King Street and University Avenue.

11. Waikiki Spur – Relocations include: Numerous 12KV underground distribution circuits along Kuhio Avenue and multiple 12KV underground crossings at Kalakaua, Launiu, Kaiolu, Lewers, Seaside and Nahua intersections. The majority of HECO, HTCo and Oceanic Time Warner's underground infrastructure feeding Waikiki is on Kuhio Avenue and will need to be relocated.

J. MANAGED LANES UTILITY RELOCATION COMMENTS

1. Waiawa Interchange - Halawa Stream Segment - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as underground relocation of 138KV overhead lines at the Waiawa Interchange, at the HECO Waiau Power Plant, and at the Aloha Stadium.
2. Halawa Stream - Pacific Street - Relocation work along this segment includes under grounding of multiple 46KV, 4/12KV, and telecommunication line crossings as well as underground relocation of 138KV overhead lines along the mauka side of the Airport Viaduct. The proposed 138KV underground line will consist of pipe-type cable that includes two transition stations for the dielectric fluid pumping plants and modification of the Airport Switching Station.

END

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : MANAGED LANES

ITEM DESCRIPTION	COST
ML-02	1,196,325
ML-03	10,010,000
ML-10	11,886,875
ML-13	6,006,000
ML-16	1,126,125
ML-17	500,500
ML-18	54,460,688
ML-19	48,767,500
ML-21	3,304,500
ML-24	601,000
ML-25	901,500
TOTAL	138,761,013

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-02

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE	300	LF	1,443		759		2,202	660,660
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	300	LF	648	194,400	340	102,000	988	296,400
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,196,325

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-03

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE	1600	LF	1,968		1,035		3,003	4,804,800
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	1600	LF	1,312	2,099,200	690	1,104,000	2,002	3,203,200
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								10,010,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-10

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE	2500	LF	1,443		759		2,202	5,505,500
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	2000	LF	1,312	2,624,000	690	1,380,000	2,002	4,004,000
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								11,886,875

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-13

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE	1600	LF	1,968		1,035		3,003	4,804,800
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								6,006,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-16

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE	300	LF	1,968		1,035		3,003	900,900
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,126,125

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-17

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	200	LF	1,312	262,400	690	138,000	2,002	400,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								500,500

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-18

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE	5300	LF	2,296		1,208		3,504	18,568,550
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION	1	EA	10,000,000	10,000,000	15,000,000	15,000,000	25,000,000	25,000,000
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								54,460,688

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-19

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE	4000	LF	2,296		1,208		3,504	14,014,000
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION	1	EA	10,000,000	10,000,000	15,000,000	15,000,000	25,000,000	25,000,000
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								48,767,500

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-21

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	600	LF	1,312	787,200	690	414,000	2,002	1,201,200
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	600	LF	648	388,800	340	204,000	988	592,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	600	LF	402	241200	451	270,600	853.00	511,800
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	600	LF	292	175200	271	162,600	563.00	337,800
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								3,304,500

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-24

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	200	LF	648	129,600	340	68,000	988	197,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	200	LF	402	80400	451	90,200	853.00	170,600
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	200	LF	292	58400	271	54,200	563.00	112,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								601,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : ML-25

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	300	LF	648	194,400	340	102,000	988	296,400
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	300	LF	402	120600	451	135,300	853.00	255,900
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	300	LF	292	87600	271	81,300	563.00	168,900
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								901,500

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : SECTION 1 - KAPOLEI

ITEM DESCRIPTION	COST
FG-01	3,286,875
FG-03	4,199,000
FG-04	1,976,000
FG-05	1,126,125
FG-07	2,725,000
FG-08	1,495,000
FG-10	1,709,000
FG-13	3,661,375
FG-14	3,524,250
FG-15	500,500
FG-16	601,000
FG-17	2,289,875
FG-19	1,495,000
FG-20	1,495,000
ALIGNMENT ALTERNATIVES	TOTALS
KAMOKILA BLVD-FARR HWY, SHEETS FG-01,02,03,04,05,06,07,08	14,808,000
KAPOLEI PKWY-NORTH-SOUTH RD, SHEETS FG-01,09,10,11,12,13,06,07,08	12,877,250
SARATOGA AVE-NORTH-SOUTH RD, SHEETS FG-01,09,14,15,16,17,12,13,06,07,08	18,083,875
GEIGER RD-FORT WEAVER RD, SHEETS FG-01,09,14,15,16,18,19,20,21,22	10,902,625

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-01

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	500	LF	1,312	656,000	690	345,000	2,002	1,001,000
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	1000	LF	402	402000	451	451,000	853.00	853,000
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								3,286,875

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-03

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF						914
138 KV PIPE TYPE CABLE		LF	2,296		1,208			3,504
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035			3,003
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759			2,202
138 KV TRANSITION STATION		EA	10,000,000		15,000,000			25,000,000
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690			2,002
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359			315,279
4 KV OR 12 KV OH TO UG CONVER	3400	LF	648	2,203,200	340	1,156,000	988	3,359,200
SEC OH TO UG CROSSING		EA	33,268		34,384			67,652
SEC OH TO UG CONVERSION 400A		LF	222		229			451.00
3 PHASE TRANSFORMER		EA	65,460		33,856			99,316.00
1 PHASE TRANSFORMER		EA	45,466		26,392			71,858.00
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628			213,168.00
TEL CABLE - CU & FO UG CONV		LF	402		451			853.00
CATV - COAX & FO CROSS		EA	73,109		67,777			140,886.00
CATV OOAX & FO UG CONV		LF	292		271			563.00
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114			204.00
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114			147.00
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000			25,000.00
TEL SERVICE OR SMALL CROSSING		EA	12000		10000			22,000.00
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000			22,000.00
								4,199,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-04

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	1600	LF	648	1,036,800	340	544,000	988	1,580,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,976,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-05

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	450	LF	1,312	590,400	690	310,500	2,002	900,900
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,126,125

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-07

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	400	LF	1,312	524,800	690	276,000	2,002	800,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	650	LF	648	421,200	340	221,000	988	642,200
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	600	LF	402	241200	451	270,600	853.00	511,800
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	400	LF	292	116800	271	108,400	563.00	225,200
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								2,725,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-08

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	400	LF	1,312	524,800	690	276,000	2,002	800,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	400	LF	648	259,200	340	136,000	988	395,200
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,495,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-10

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	400	LF	1,312	524,800	690	276,000	2,002	800,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	400	LF	402	160800	451	180,400	853.00	341,200
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	400	LF	292	116800	271	108,400	563.00	225,200
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,709,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-13

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES	2000	LF					914	1,828,000
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	550	LF	1,312	721,600	690	379,500	2,002	1,101,100
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								3,661,375

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-14

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF						914
138 KV PIPE TYPE CABLE		LF	2,296		1,208			3,504
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035			3,003
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759			2,202
138 KV TRANSITION STATION		EA	10,000,000		15,000,000			25,000,000
46 KV RELOCATION OR OH-UG CONV	800	LF	1,312	1,049,600	690	552,000	2,002	1,601,600
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359			315,279
4 KV OR 12 KV OH TO UG CONVER	200	LF	648	129,600	340	68,000	988	197,600
SEC OH TO UG CROSSING		EA	33,268		34,384			67,652
SEC OH TO UG CONVERSION 400A		LF	222		229			451.00
3 PHASE TRANSFORMER		EA	65,460		33,856			99,316.00
1 PHASE TRANSFORMER		EA	45,466		26,392			71,858.00
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628			213,168.00
TEL CABLE - CU & FO UG CONV	800	LF	402	321600	451	360,800	853.00	682,400
CATV - COAX & FO CROSS		EA	73,109		67,777			140,886.00
CATV OOAX & FO UG CONV	600	LF	292	175200	271	162,600	563.00	337,800
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114			204.00
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114			147.00
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000			25,000.00
TEL SERVICE OR SMALL CROSSING		EA	12000		10000			22,000.00
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000			22,000.00
								3,524,250

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-15

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	200	LF	1,312	262,400	690	138,000	2,002	400,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								500,500

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-16

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	200	LF	648	129,600	340	68,000	988	197,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	200	LF	402	80400	451	90,200	853.00	170,600
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	200	LF	292	58400	271	54,200	563.00	112,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								601,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-17

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	300	LF	1,312	393,600	690	207,000	2,002	600,600
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	300	LF	648	194,400	340	102,000	988	296,400
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	700	LF	402	281400	451	315,700	853.00	597,100
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	600	LF	292	175200	271	162,600	563.00	337,800
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								2,289,875

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-19

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	400	LF	1,312	524,800	690	276,000	2,002	800,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	400	LF	648	259,200	340	136,000	988	395,200
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,495,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-20

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	400	LF	1,312	524,800	690	276,000	2,002	800,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	400	LF	648	259,200	340	136,000	988	395,200
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,495,000

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MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : SECTION 2 - FARRINGTON-KAMEHAMEHA

ITEM DESCRIPTION	COST
DRAWING NUMBERS	
FG-23	3,303,375
FG-24	1,454,750
FG-25	1,289,250
FG-26	14,887,625
FG-27	14,389,375
FG-28	601,000
TOTAL	35,925,375

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-23

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	600	LF	1,312	787,200	690	414,000	2,002	1,201,200
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	1200	LF	648	777,600	340	408,000	988	1,185,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	300	LF	402	120600	451	135,300	853.00	255,900
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								3,303,375

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-24

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	200	LF	1,312	262,400	690	138,000	2,002	400,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	600	LF	648	388,800	340	204,000	988	592,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	200	LF	402	80400	451	90,200	853.00	170,600
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,454,750

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-25

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	300	LF	402	120600	451	135,300	853.00	255,900
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								1,289,250

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-26

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE	2100	LF	1,968		1,035		3,003	6,306,300
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	2100	LF	1,312	2,755,200	690	1,449,000	2,002	4,204,200
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	700	LF	648	453,600	340	238,000	988	691,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	500	LF	402	201000	451	225,500	853.00	426,500
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								14,887,625

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-27

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE	2500	LF	1,968		1,035		3,003	7,507,500
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV	2000	LF	1,312	2,624,000	690	1,380,000	2,002	4,004,000
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								14,389,375

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : FG-28

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV DBL CKT OH STEEL POLES		LF					914	
138 KV PIPE TYPE CABLE		LF	2,296		1,208		3,504	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,968		1,035		3,003	
138 KV 1600A SOLID DIELECTRIC CABLE		LF	1,443		759		2,202	
138 KV TRANSITION STATION		EA	10,000,000		15,000,000		25,000,000	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	200	LF	648	129,600	340	68,000	988	197,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	200	LF	402	80400	451	90,200	853.00	170,600
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	200	LF	292	58400	271	54,200	563.00	112,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								601,000

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MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

SECTION 3	COST
SALT LAKE BLVD/NORTH KING STREET	
AIEA ACCESS RD TO AHUA ST.	17,841,124
AHUA ST TO NORTH KING	2,564,984
TOTAL	20,406,108
SALT LAKE BLVD/DILLINGHAM BLVD	
AIEA ACCESS RD TO AHUA ST.	17,841,124
AHUA ST TO DILLINGHAM	1,828,357
TOTAL	19,669,481
MAUKA SIDE OF AIRPORT VIADUCT AT GRADE	
AIEA ACCESS RD TO 6TH CENTER DRIVE	22,701,746
6TH CENTER DRIVE TO DILLINGHAM (MAUKA GROUND)	117,786,176
TOTAL	140,487,922
MAUKA SIDE OF AIRPORT VIADUCT ELEVATED	
AIEA ACCESS RD TO 6TH CENTER DRIVE	22,701,746
6TH CENTER DRIVE TO DILLINGHAM (MAUKA ELEVATED)	92,786,176
TOTAL	115,487,922
MAKAI OF THE AIRPORT VIADUCT	
AIEA ACCESS RD TO 6TH CENTER DRIVE	22,701,746
6TH CENTER DRIVE TO AOLELE	3,538,776
AOLELE TO NIMITZ (MAKAI)	2,189,500
TOTAL	28,430,022
AOLELE STREET	
AIEA ACCESS RD TO 6TH CENTER DRIVE	22,701,746
6TH CENTER DRIVE TO AOLELE	3,538,776
AOLELE TO NIMITZ (AIRPORT)	1,195,737
TOTAL	27,436,259

MK ENGINEERS, LTD.

AIEA TO AHUA

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	4	EA	545,595	2,182,380	300,512	1,202,046	846,107	3,384,426
46 KV TRANSVERSE CROSSING CONVERSION	8	EA	363,730	2,909,840	200,341	1,602,728	564,071	4,512,568
46 KV RELOCATION OR OH-UG CONV	700	LF	1,312	918,400	690	483,000	2,002	1,401,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	2	EA	193,920	387,840	121,359	242,718	315,279	630,558
4 KV OR 12 KV OH TO UG CONVER	700	LF	648	453,600	340	238,000	988	691,600
SEC OH TO UG CROSSING	3	EA	33,268	99,804	34,384	103,152	67,652	202,956
SEC OH TO UG CONVERSION 400A	700	LF	222	155400	229	160,300	451.00	315,700
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	13	EA	100,540	1307020	112,628	1,464,164	213,168.00	2,771,184
TEL CABLE - CU & FO UG CONV	1400	LF	402	562800	451	631,400	853.00	1,194,200
CATV - COAX & FO CROSS	12	EA	73,109	877308	67,777	813,324	140,886.00	1,690,632
CATV OOAX & FO UG CONV	700	LF	292	204400	271	189,700	563.00	394,100
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE	1350	LF	90	121500	114	153,900	204.00	275,400
STREE LIGHT CONVERSION - COBRA HEAD	1200	LF	33	39600	114	136,800	147.00	176,400
SECONDARY SERVICE OR SMALL LATERAL	8	EA	15000	120000	10000	80,000	25,000.00	200,000
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								17,841,124

MK ENGINEERS, LTD.

AHUA TO N. KING

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		LF	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	4	EA	363,730	1,454,920	200,341	801,364	564,071	2,256,284
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	2100	LF	33	69300	114	239,400	147.00	308,700
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								2,564,984

MK ENGINEERS, LTD.

AHUA TO DILLINGHAM

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	1	EA	545,595	545,595	300,512	300,512	846,107	846,107
46 KV TRANSVERSE CROSSING CONVERSION	1	EA	363,730	363,730	200,341	200,341	564,071	564,071
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	1	EA	193,920	193,920	121,359	121,359	315,279	315,279
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	700	LF	33	23100	114	79,800	147.00	102,900
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								1,828,357

MK ENGINEERS, LTD.

AIEA TO 6TH

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	3	EA	545,595	1,636,785	300,512	901,535	846,107	2,538,320
46 KV TRANSVERSE CROSSING CONVERSION	6	EA	363,730	2,182,380	200,341	1,202,046	564,071	3,384,426
46 KV RELOCATION OR OH-UG CONV	1400	LF	1,312	1,836,800	690	966,000	2,002	2,802,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	2	EA	193,920	387,840	121,359	242,718	315,279	630,558
4 KV OR 12 KV OH TO UG CONVER	1400	LF	648	907,200	340	476,000	988	1,383,200
SEC OH TO UG CROSSING	1	EA	33,268	33,268	34,384	34,384	67,652	67,652
SEC OH TO UG CONVERSION 400A	1400	LF	222	310800	229	320,600	451.00	631,400
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	3	EA	100,540	301620	112,628	337,884	213,168.00	639,504
TEL CABLE - CU & FO UG CONV	8400	LF	402	3376800	451	3,788,400	853.00	7,165,200
CATV - COAX & FO CROSS	1	EA	73,109	73109	67,777	67,777	140,886.00	140,886
CATV OOAX & FO UG CONV	5000	LF	292	1460000	271	1,355,000	563.00	2,815,000
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	700	LF	90	63000	114	79,800	204.00	142,800
STREE LIGHT CONVERSION - COBRA HEAD	2000	LF	33	66000	114	228,000	147.00	294,000
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING	2	EA	12000	24000	10000	20,000	22,000.00	44,000
CATV SERVICE FOR SMALL CROSSING	1	EA	12000	12000	10000	10,000	22,000.00	22,000
TOTAL COST								22,701,746

MK ENGINEERS, LTD.

6TH TO DILLINGHAM ELEVATED

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	2	EA	545,595	1,091,190	300,512	601,023	846,107	1,692,213
138 KV PIPE TYPE CABLE	10000	LF	2,296	22,960,000	1,208	12,075,000	3,504	35,035,000
138 KV SWITCHING STATION	2	EA	10,000,000	20,000,000	15,000,000	30,000,000	25,000,000	50,000,000
46 KV TRANSVERSE CROSSING CONVERSION	4	EA	363,730	1,454,920	200,341	801,364	564,071	2,256,284
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	1	EA	193,920	193,920	121,359	121,359	315,279	315,279
4 KV OR 12 KV OH TO UG CONVER	3500	LF	648	2,268,000	340	1,190,000	988	3,458,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	200	LF	33	6600	114	22,800	147.00	29,400
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								92,786,176

MK ENGINEERS, LTD.

6TH TO DILLINGHAM AT GRADE

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	2	EA	545,595	1,091,190	300,512	601,023	846,107	1,692,213
138 KV PIPE TYPE CABLE	10000	LF	2,296	22,960,000	1,208	12,075,000	3,504	35,035,000
138 KV SWITCHING STATION	3	EA	10,000,000	30,000,000	15,000,000	45,000,000	25,000,000	75,000,000
46 KV TRANSVERSE CROSSING CONVERSION	4	EA	363,730	1,454,920	200,341	801,364	564,071	2,256,284
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	1	EA	193,920	193,920	121,359	121,359	315,279	315,279
4 KV OR 12 KV OH TO UG CONVER	3500	LF	648	2,268,000	340	1,190,000	988	3,458,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	200	LF	33	6600	114	22,800	147.00	29,400
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								117,786,176

MK ENGINEERS, LTD.

6TH TO AOLELE

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		LF	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	6	EA	363,730	2,182,380	200,341	1,202,046	564,071	3,384,426
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	1050	LF	33	34650	114	119,700	147.00	154,350
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								3,538,776

MK ENGINEERS, LTD.

AOLELE TO NIMITZ

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		LF	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	1300	LF	402	522600	451	586,300	853.00	1,108,900
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV	700	LF	292	204400	271	189,700	563.00	394,100
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	4500	LF	33	148500	114	513,000	147.00	661,500
SECONDARY SERVICE OR SMALL LATERAL	1	EA	15000	15000	10000	10,000	25,000.00	25,000
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								2,189,500

MK ENGINEERS, LTD.

AOLELE TO NIMITZ AIRPORT

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		LF	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	3	EA	193,920	581,760	121,359	364,077	315,279	945,837
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV OOAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	1700	LF	33	56100	114	193,800	147.00	249,900
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
TOTAL COST								1,195,737

MK ENGINEERS, LTD.
OPINION OF PROBABLE CONSTRUCTION COST: **SECTION 4 -**
CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS
PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSE
LOCATION : OAHU

SECTION 4 - DILLINGHAM -KING	
DILLINGHAM	\$90,100,000
KING STREET	\$62,000,000
MIDDLE STREET	\$380,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST: **SECTION 4 - DILLINGHAM BLVD SEGMENT**

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	7	ea	545,595	3,819,165	300,512	2,103,581	846,107	5,922,746
46 KV TRANSVERSE CROSSING CONVERSION	7	EA	363,730	2,546,110	200,341	1,402,387	564,071	3,948,497
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	10	EA	193,920	1,939,200	121,359	1,213,590	315,279	3,152,790
4 KV OR 12 KV OH TO UG CONVER	8000	LF	648	5,184,000	340	2,720,000	988	7,904,000
SEC OH TO UG CROSSING	10	EA	33,268	332,680	34,384	343,840	67,652	676,520
SEC OH TO UG CONVERSION 400A	3	LF	222	666	229	687	451.00	1,353
3 PHASE TRANSFORMER	12	EA	65,460	785,520	33,856	406,272	99,316.00	1,191,792
1 PHASE TRANSFORMER	4	EA	45,466	181,864	26,392	105,568	71,858.00	287,432
TEL CABLE - CU & FO TRANSVERSE CROSS	47	EA	100,540	4,725,380	112,628	5,293,516	213,168.00	10,018,896
TEL CABLE - CU & FO UG CONV	12100	LF	402	4,864,200	451	5,457,100	853.00	10,321,300
CATV - COAX & FO CROSS	29	EA	73,109	2,120,161	67,777	1,965,533	140,886.00	4,085,694
CATV COAX & FO UG CONV	12100	LF	292	3,533,200	271	3,279,100	563.00	6,812,300
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	21500	LF	33	709,500	114	2,451,000	147.00	3,160,500
SECONDARY SERVICE OR SMALL LATERAL	25	EA	15000	375,000	10000	250,000	25,000.00	625,000
TEL SERVICE OR SMALL CROSSING	25	EA	12000	300,000	10000	250,000	22,000.00	550,000
CATV SERVICE FOR SMALL CROSSING	25	EA	12000	300,000	10000	250,000	22,000.00	550,000
AT&T DUCTLINE	11000	LF	603	6,633,000	1,298	14,272,500	1,901	20,905,500
HECO IWILEI SS EQPT	1	LS					10,000,000	10,000,000
SUBTOTALS				38,349,646		41,764,674		90,114,320
SEGMENT TOTAL								90,114,320
							SAY	\$90,100,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST: **SECTION 4 - KING STREET SEGMENT**

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	1	EA	545,595	545,595	300,512	300,512	846,107	846,107
46 KV TRANSVERSE CROSSING CONVERSION	1	EA	363,730	363,730	200,341	200,341	564,071	564,071
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	9	EA	193,920	1,745,280	121,359	1,092,231	315,279	2,837,511
4 KV OR 12 KV OH TO UG CONVER	8400	LF	648	5,443,200	340	2,856,000	988	8,299,200
SEC OH TO UG CROSSING	20	EA	33,268	665,360	34,384	687,680	67,652	1,353,040
SEC OH TO UG CONVERSION 400A	2	LF	222	444	229	458	451.00	902
3 PHASE TRANSFORMER	15	EA	65,460	981,900	33,856	507,840	99,316.00	1,489,740
1 PHASE TRANSFORMER	9	EA	45,466	409,194	26,392	237,528	71,858.00	646,722
TEL CABLE - CU & FO TRANSVERSE CROSS	43	EA	100,540	4,323,220	112,628	4,843,004	213,168.00	9,166,224
TEL CABLE - CU & FO UG CONV	27700	LF	402	11,135,400	451	12,492,700	853.00	23,628,100
CATV - COAX & FO CROSS	27	EA	73,109	1,973,943	67,777	1,829,979	140,886.00	3,803,922
CATV COAX & FO UG CONV	12300	LF	292	3,591,600	271	3,333,300	563.00	6,924,900
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	9930	LF	90	893,700	114	1,132,020	204.00	2,025,720
STREET LIGHT CONVERSION - COBRA		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
SUBTOTALS				32,072,566		29,513,593		61,586,159
SEGEMENT TOTAL								61,586,159
							SAY	\$62,000,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST: **SECTION 4 - MIDDLE STREET SEGMENT**

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : OAHU

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV		LF	402		451		853.00	
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV		LF	292		271		563.00	
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREE LIGHT CONVERSION - COBRA HEAD	2600	LF	33	85,800	114	296,400	147.00	382,200
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
SUBTOTALS				85,800		296,400		382,200
SEGMENT TOTAL								382,200
							SAY	\$380,000

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : SECTION 5 SUMMARY

ITEM DESCRIPTION	COST
North King St/Hotel St/Kawaiahao St/Kapiolani Blvd:	
Liliha Station to King Street to Hotel Street	4,260,907
Hotel Street from River Street to Punchbowl	33,361,508
Punchbowl to Kawaiahao Street up to Kamakee Street	30,894,711
Kona Street between Kamakee and Piikoi	25,157,322
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, North King St/Hotel St/Kawaiahao St/Kapiolani Blvd	269,663,714
Dillingham Blvd/Hotel St/Kawaiahao St/Kapiolani Blvd	
Dillingham to Hotel Street	6,373,420
Hotel Street from River Street to Punchbowl	33,361,508
Punchbowl to Kawaiahao Street up to Kamakee Street	30,894,711
Kona Street between Kamakee and Piikoi	25,157,322
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, Dillingham Blvd/Hotel St/Kawaiahao St/Kapiolani Blvd	271,776,227
North King St/Hotel St/Waimanu St/Kapiolani Blvd	
Liliha Station to King Street to Hotel Street	4,260,907
Hotel Street from River Street to Punchbowl	33,361,508
Punchbowl to Kapiolani to Waimanu Street up to Kamakee	13,111,604
Kona Street between Kamakee and Piikoi	25,157,322
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, North King St/Hotel St/Waimanu St/Kapiolani Blvd	251,880,607
Dillingham Blvd/Hotel St/Waimanu St/Kapiolani Blvd	
Dillingham to Hotel Street	6,373,420
Hotel Street from River Street to Punchbowl	33,361,508
Punchbowl to Kapiolani to Waimanu Street up to Kamakee	13,111,604
Kona Street between Kamakee and Piikoi	25,157,322
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, Dillingham Blvd/Hotel St/Waimanu St/Kapiolani Blvd	253,993,120
North King St/Nimitz Hwy/Queen St/Kapiolani Blvd	
Liliha Station to Nimitz	3,349,065
Nimitz from River Street to Nuuanu/Queen	21,351,045
Queen from Nuuanu Avenue to Sta 1434	39,187,939
Queen Street from Sta 1434 to Piikoi	12,915,288
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, North King St/Nimitz Hwy/Queen St/Kapiolani Blvd	252,792,603

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : SECTION 5 SUMMARY

ITEM DESCRIPTION	COST
Dillingham Blvd/Nimitz Hwy/Queen St/Kapiolani Blvd	
Dillingham to Nimitz	4,268,671
Nimitz from River Street to Nuuanu/Queen	21,351,045
Queen from Nuuanu Avenue to Sta 1434	39,187,939
Queen Street from Sta 1434 to Piikoi	12,915,288
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, Dillingham Blvd/Nimitz Hwy/Queen St/Kapiolani Blvd	253,712,209
North King St/Nimitz Hwy/Halekauwila St/Kapiolani Blvd	
Liliha Station to Nimitz	3,349,065
Nimitz from River Street to Nuuanu/Queen	21,351,045
Nimitz from Nuuanu to Halekauwila to Sta 1434	56,885,516
Queen Street from Sta 1434 to Piikoi	12,915,288
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, North King St/Nimitz Hwy/Halekauwila St/Kapiolani Blvd	270,490,180
Dillingham Blvd/Nimitz Hwy/Halekauwila St/Kapiolani Blvd	
Dillingham to Nimitz	4,268,671
Nimitz from River Street to Nuuanu/Queen	21,351,045
Nimitz from Nuuanu to Halekauwila to Sta 1434	56,885,516
Queen Street from Sta 1434 to Piikoi	12,915,288
Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley	170,014,435
Pucks Alley to UH	5,974,831
Total, Dillingham Blvd/Nimitz Hwy/Halekauwila St/Kapiolani Blvd	271,409,786
North King St/Beretania St/South King St	
S. Beretania from Liliha Station to River Street	4,260,907
S. Beretania from River Street to King Street to Pucks Alley	65,953,459
Pucks Alley to UH	5,974,831
Total, North King St/Beretania St/South King St	76,189,197
Dillingham Blvd/Beretania St/South King St	
Dillingham to S. Beretania	6,271,420
S. Beretania from River Street to King Street to Pucks Alley	65,953,459
Pucks Alley to UH	5,974,831
Total, Dillingham Blvd/Beretania St/South King St	78,199,710
Waikiki Spur	75,475,542

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : S. Beretania from Liliha Station to River Street

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	1	EA	545,595	545,595	300,512	300,512	846,107	846,107
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	2	EA	363,730	727,460	200,341	400,682	564,071	1,128,142
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	2	EA	193,920	387,840	121,359	242,718	315,279	630,558
4 KV OR 12 KV OH TO UG CONVER	100	LF	648	64,800	340	34,000	988	98,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	1000	LF	402	402000	451	451,000	853.00	853,000
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	700	LF	292	204400	271	189,700	563.00	394,100
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	800	LF	90	72000	114	91,200	204.00	163,200
STREET LIGHT CONVERSION - COBRA HEAD	1000	LF	33	33000	114	114,000	147.00	147,000
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								4,260,907

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Liliha Station to King Street to Hotel Street

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	1	EA	545,595	545,595	300,512	300,512	846,107	846,107
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	2	EA	363,730	727,460	200,341	400,682	564,071	1,128,142
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	2	EA	193,920	387,840	121,359	242,718	315,279	630,558
4 KV OR 12 KV OH TO UG CONVER	100	LF	648	64,800	340	34,000	988	98,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	1000	LF	402	402000	451	451,000	853.00	853,000
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	700	LF	292	204400	271	189,700	563.00	394,100
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	800	LF	90	72000	114	91,200	204.00	163,200
STREET LIGHT CONVERSION - COBRA HEAD	1000	LF	33	33000	114	114,000	147.00	147,000
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								4,260,907

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Liliha Station to Nimitz

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	1	EA	545,595	545,595	300,512	300,512	846,107	846,107
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	2	EA	363,730	727,460	200,341	400,682	564,071	1,128,142
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	1	EA	65,460	65460	33,856	33,856	99,316.00	99,316
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	500	LF	402	201000	451	225,500	853.00	426,500
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	500	LF	33	16500	114	57,000	147.00	73,500
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								3,349,065

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Dillingham to S. Beretania

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	3	EA	545,595	1,636,785	300,512	901,535	846,107	2,538,320
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	4	EA	363,730	1,454,920	200,341	801,364	564,071	2,256,284
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	1	EA	65,460	65460	33,856	33,856	99,316.00	99,316
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	500	LF	402	201000	451	225,500	853.00	426,500
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	500	LF	90	45000	114	57,000	204.00	102,000
STREET LIGHT CONVERSION - COBRA HEAD	500	LF	33	16500	114	57,000	147.00	73,500
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								6,271,420

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Dillingham to Hotel Street

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	3	EA	545,595	1,636,785	300,512	901,535	846,107	2,538,320
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	4	EA	363,730	1,454,920	200,341	801,364	564,071	2,256,284
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	1	EA	65,460	65460	33,856	33,856	99,316.00	99,316
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	500	LF	402	201000	451	225,500	853.00	426,500
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	1000	LF	90	90000	114	114,000	204.00	204,000
STREET LIGHT CONVERSION - COBRA HEAD	500	LF	33	16500	114	57,000	147.00	73,500
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								6,373,420

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Dillingham to Nimitz

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	2	EA	545,595	1,091,190	300,512	601,023	846,107	1,692,213
SECONDARY NETWORK DISTRIBUTION SYSTEM		LF	370		294		664	
46 KV TRANSVERSE CROSSING CONVERSION	2	EA	363,730	727,460	200,341	400,682	564,071	1,128,142
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING		EA	193,920		121,359		315,279	
4 KV OR 12 KV OH TO UG CONVER	500	LF	648	324,000	340	170,000	988	494,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	1	EA	65,460	65460	33,856	33,856	99,316.00	99,316
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS		EA	100,540		112,628		213,168.00	
TEL CABLE - CU & FO UG CONV	500	LF	402	201000	451	225,500	853.00	426,500
CATV - COAX & FO CROSS		EA	73,109		67,777		140,886.00	
CATV COAX & FO UG CONV	500	LF	292	146000	271	135,500	563.00	281,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	1000	LF	33	33000	114	114,000	147.00	147,000
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING		EA	12000		10000		22,000.00	
CATV SERVICE FOR SMALL CROSSING		EA	12000		10000		22,000.00	
								4,268,671

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : S. Beretania from River Street to King Street to Pucks Alley

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	2	EA	545,595	1,091,190	300,512	601,023	846,107	1,692,213
SECONDARY NETWORK DISTRIBUTION SYSTEM	700	LF	370	259,000	294	205,800	664	464,800
46 KV TRANSVERSE CROSSING CONVERSION	8	EA	363,730	2,909,840	200,341	1,602,728	564,071	4,512,568
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	36	EA	193,920	6,981,120	121,359	4,368,924	315,279	11,350,044
4 KV OR 12 KV OH TO UG CONVER	9600	LF	648	6,220,800	340	3,264,000	988	9,484,800
SEC OH TO UG CROSSING	10	EA	33,268	332,680	34,384	343,840	67,652	676,520
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	21	EA	65,460	1374660	33,856	710,976	99,316.00	2,085,636
1 PHASE TRANSFORMER	12	EA	45,466	545592	26,392	316,704	71,858.00	862,296
TEL CABLE - CU & FO TRANSVERSE CROSS	32	EA	100,540	3217280	112,628	3,604,096	213,168.00	6,821,376
TEL CABLE - CU & FO UG CONV	15000	LF	402	6030000	451	6,765,000	853.00	12,795,000
CATV - COAX & FO CROSS	21	EA	73,109	1535289	67,777	1,423,317	140,886.00	2,958,606
CATV COAX & FO UG CONV	15000	LF	292	4380000	271	4,065,000	563.00	8,445,000
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	400	LF	90	36000	114	45,600	204.00	81,600
STREET LIGHT CONVERSION - COBRA HEAD	15000	LF	33	495000	114	1,710,000	147.00	2,205,000
SECONDARY SERVICE OR SMALL LATERAL	22	EA	15000	330000	10000	220,000	25,000.00	550,000
TEL SERVICE OR SMALL CROSSING	22	EA	12000	264000	10000	220,000	22,000.00	484,000
CATV SERVICE FOR SMALL CROSSING	22	EA	12000	264000	10000	220,000	22,000.00	484,000
								65,953,459

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Pucks Alley to UH

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	1	EA	363,730	363,730	200,341	200,341	564,071	564,071
46 KV RELOCATION OR OH-UG CONV	700	LF	1,312	918,400	690	483,000	2,002	1,401,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	4	EA	193,920	775,680	121,359	485,436	315,279	1,261,116
4 KV OR 12 KV OH TO UG CONVER		LF	648		340		988	
SEC OH TO UG CROSSING	2	EA	33,268	66,536	34,384	68,768	67,652	135,304
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	2	EA	65,460	130920	33,856	67,712	99,316.00	198,632
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	2	EA	100,540	201080	112,628	225,256	213,168.00	426,336
TEL CABLE - CU & FO UG CONV	1200	LF	402	482400	451	541,200	853.00	1,023,600
CATV - COAX & FO CROSS	2	EA	73,109	146218	67,777	135,554	140,886.00	281,772
CATV COAX & FO UG CONV	200	LF	292	58400	271	54,200	563.00	112,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	2000	LF	33	66000	114	228,000	147.00	294,000
SECONDARY SERVICE OR SMALL LATERAL	4	EA	15000	60000	10000	40,000	25,000.00	100,000
TEL SERVICE OR SMALL CROSSING	4	EA	12000	48000	10000	40,000	22,000.00	88,000
CATV SERVICE FOR SMALL CROSSING	4	EA	12000	48000	10000	40,000	22,000.00	88,000
								5,974,831

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Hotel Street from River Street to Punchbowl

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
SECONDARY NETWORK DISTRIBUTION SYSTEM	4800	LF	370	1,776,000	294	1,411,200	664	3,187,200
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	8	EA	193,920	1,551,360	121,359	970,872	315,279	2,522,232
4 KV OR 12 KV OH TO UG CONVER	2000	LF	648	1,296,000	340	680,000	988	1,976,000
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	10	EA	65,460	654600	33,856	338,560	99,316.00	993,160
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	50	EA	100,540	5027000	112,628	5,631,400	213,168.00	10,658,400
TEL CABLE - CU & FO UG CONV	16000	LF	402	6432000	451	7,216,000	853.00	13,648,000
CATV - COAX & FO CROSS	6	EA	73,109	438654	67,777	406,662	140,886.00	845,316
CATV COAX & FO UG CONV	3200	LF	292	934400	271	867,200	563.00	1,801,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	3200	LF	90	288000	114	364,800	204.00	652,800
STREET LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL		EA	15000		10000		25,000.00	
TEL SERVICE OR SMALL CROSSING	6	EA	12000	72000	10000	60,000	22,000.00	132,000
CATV SERVICE FOR SMALL CROSSING	6	EA	12000	72000	10000	60,000	22,000.00	132,000
								33,361,508

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Punchbowl to Kapiolani to Waimanu Street up to Kamakee

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	8	EA	193,920	1,551,360	121,359	970,872	315,279	2,522,232
4 KV OR 12 KV OH TO UG CONVER	2500	LF	648	1,620,000	340	850,000	988	2,470,000
SEC OH TO UG CROSSING	10	EA	33,268	332,680	34,384	343,840	67,652	676,520
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	8	EA	65,460	523680	33,856	270,848	99,316.00	794,528
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	6	EA	100,540	603240	112,628	675,768	213,168.00	1,279,008
TEL CABLE - CU & FO UG CONV	2500	LF	402	1005000	451	1,127,500	853.00	2,132,500
CATV - COAX & FO CROSS	6	EA	73,109	438654	67,777	406,662	140,886.00	845,316
CATV COAX & FO UG CONV	2500	LF	292	730000	271	677,500	563.00	1,407,500
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	2000	LF	33	66000	114	228,000	147.00	294,000
SECONDARY SERVICE OR SMALL LATERAL	10	EA	15000	150000	10000	100,000	25,000.00	250,000
TEL SERVICE OR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
CATV SERVICE FOR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
								13,111,604

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Punchbowl to Kawaiahao Street up to Kamakee Street

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	1	EA	363,730	363,730	200,341	200,341	564,071	564,071
46 KV RELOCATION OR OH-UG CONV	4400	LF	1,312	5,772,800	690	3,036,000	2,002	8,808,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	12	EA	193,920	2,327,040	121,359	1,456,308	315,279	3,783,348
4 KV OR 12 KV OH TO UG CONVER	5600	LF	648	3,628,800	340	1,904,000	988	5,532,800
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	7	EA	65,460	458220	33,856	236,992	99,316.00	695,212
1 PHASE TRANSFORMER	4	EA	45,466	181864	26,392	105,568	71,858.00	287,432
TEL CABLE - CU & FO TRANSVERSE CROSS	12	EA	100,540	1206480	112,628	1,351,536	213,168.00	2,558,016
TEL CABLE - CU & FO UG CONV	3800	LF	402	1527600	451	1,713,800	853.00	3,241,400
CATV - COAX & FO CROSS	12	EA	73,109	877308	67,777	813,324	140,886.00	1,690,632
CATV COAX & FO UG CONV	3800	LF	292	1109600	271	1,029,800	563.00	2,139,400
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	3800	LF	33	125400	114	433,200	147.00	558,600
SECONDARY SERVICE OR SMALL LATERAL	15	EA	15000	225000	10000	150,000	25,000.00	375,000
TEL SERVICE OR SMALL CROSSING	15	EA	12000	180000	10000	150,000	22,000.00	330,000
CATV SERVICE FOR SMALL CROSSING	15	EA	12000	180000	10000	150,000	22,000.00	330,000
								30,894,711

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Kona Street between Kamakee and Piikoi

(ADD TO KAWAIHAO AND WAIMANU S

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING	700	LF	2,296	1,607,200	1,208	845,250	3,504	2,452,450
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV	3300	LF	1,312	4,329,600	690	2,277,000	2,002	6,606,600
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	8	EA	193,920	1,551,360	121,359	970,872	315,279	2,522,232
4 KV OR 12 KV OH TO UG CONVER	8000	LF	648	5,184,000	340	2,720,000	988	7,904,000
SEC OH TO UG CROSSING	10	EA	33,268	332,680	34,384	343,840	67,652	676,520
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	5	EA	65,460	327300	33,856	169,280	99,316.00	496,580
1 PHASE TRANSFORMER	4	EA	45,466	181864	26,392	105,568	71,858.00	287,432
TEL CABLE - CU & FO TRANSVERSE CROSS	2	EA	100,540	201080	112,628	225,256	213,168.00	426,336
TEL CABLE - CU & FO UG CONV	1800	LF	402	723600	451	811,800	853.00	1,535,400
CATV - COAX & FO CROSS	2	EA	73,109	146218	67,777	135,554	140,886.00	281,772
CATV COAX & FO UG CONV	1800	LF	292	525600	271	487,800	563.00	1,013,400
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	1800	LF	33	59400	114	205,200	147.00	264,600
SECONDARY SERVICE OR SMALL LATERAL	10	EA	15000	150000	10000	100,000	25,000.00	250,000
TEL SERVICE OR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
CATV SERVICE FOR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
								25,157,322

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Kona Street (from Piikoi) to Kapiolani and University up to Pucks Alley

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV RELOCATION	7900	LF	2,296	18,138,400	1,208	9,539,250	3,504	27,677,650
46 KV TRANSVERSE CROSSING CONVERSION	3	EA	363,730	1,091,190	200,341	601,023	564,071	1,692,213
46 KV RELOCATION OR OH-UG CONV	44300	LF	1,312	58,121,600	690	30,567,000	2,002	88,688,600
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	24	EA	193,920	4,654,080	121,359	2,912,616	315,279	7,566,696
4 KV OR 12 KV OH TO UG CONVER	19100	LF	648	12,376,800	340	6,494,000	988	18,870,800
RELOCATE SUBMERSIBLE TRANSFORMERS	3	EA					100,000	300,000
SEC OH TO UG CROSSING	27	EA	33,268	898,236	34,384	928,368	67,652	1,826,604
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	12	EA	65,460	785520	33,856	406,272	99,316.00	1,191,792
1 PHASE TRANSFORMER	4	EA	45,466	181864	26,392	105,568	71,858.00	287,432
TEL CABLE - CU & FO TRANSVERSE CROSS	12	EA	100,540	1206480	112,628	1,351,536	213,168.00	2,558,016
TEL CABLE - CU & FO UG CONV	10100	LF	402	4060200	451	4,555,100	853.00	8,615,300
CATV - COAX & FO CROSS	12	EA	73,109	877308	67,777	813,324	140,886.00	1,690,632
CATV COAX & FO UG CONV	10100	LF	292	2949200	271	2,737,100	563.00	5,686,300
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	10200	LF	33	336600	114	1,162,800	147.00	1,499,400
SECONDARY SERVICE OR SMALL LATERAL	27	EA	15000	405000	10000	270,000	25,000.00	675,000
TEL SERVICE OR SMALL CROSSING	27	EA	12000	324000	10000	270,000	22,000.00	594,000
CATV SERVICE FOR SMALL CROSSING	27	EA	12000	324000	10000	270,000	22,000.00	594,000
								170,014,435

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Nimitz from River Street to Nuuanu/Queen

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV	6400	LF	1,312	8,396,800	690	4,416,000	2,002	12,812,800
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	5	EA	193,920	969,600	121,359	606,795	315,279	1,576,395
4 KV OR 12 KV OH TO UG CONVER	3200	LF	648	2,073,600	340	1,088,000	988	3,161,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	1	EA	65,460	65460	33,856	33,856	99,316.00	99,316
1 PHASE TRANSFORMER	1	EA	45,466	45466	26,392	26,392	71,858.00	71,858
TEL CABLE - CU & FO TRANSVERSE CROSS	3	EA	100,540	301620	112,628	337,884	213,168.00	639,504
TEL CABLE - CU & FO UG CONV	1600	LF	402	643200	451	721,600	853.00	1,364,800
CATV - COAX & FO CROSS	2	EA	73,109	146218	67,777	135,554	140,886.00	281,772
CATV COAX & FO UG CONV	1600	LF	292	467200	271	433,600	563.00	900,800
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	1600	LF	33	52800	114	182,400	147.00	235,200
SECONDARY SERVICE OR SMALL LATERAL	3	EA	15000	45000	10000	30,000	25,000.00	75,000
TEL SERVICE OR SMALL CROSSING	3	EA	12000	36000	10000	30,000	22,000.00	66,000
CATV SERVICE FOR SMALL CROSSING	3	EA	12000	36000	10000	30,000	22,000.00	66,000
								21,351,045

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Queen from Nuuanu Avenue to Sta 1434

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	1	EA	363,730	363,730	200,341	200,341	564,071	564,071
46 KV RELOCATION OR OH-UG CONV	2000	LF	1,312	2,624,000	690	1,380,000	2,002	4,004,000
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	16	EA	193,920	3,102,720	121,359	1,941,744	315,279	5,044,464
4 KV OR 12 KV OH TO UG CONVER	8500	LF	648	5,508,000	340	2,890,000	988	8,398,000
SEC OH TO UG CROSSING	20	EA	33,268	665,360	34,384	687,680	67,652	1,353,040
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	6	EA	65,460	392760	33,856	203,136	99,316.00	595,896
1 PHASE TRANSFORMER	2	EA	45,466	90932	26,392	52,784	71,858.00	143,716
TEL CABLE - CU & FO TRANSVERSE CROSS	15	EA	100,540	1508100	112,628	1,689,420	213,168.00	3,197,520
TEL CABLE - CU & FO UG CONV	8200	LF	402	3296400	451	3,698,200	853.00	6,994,600
CATV - COAX & FO CROSS	12	EA	73,109	877308	67,777	813,324	140,886.00	1,690,632
CATV COAX & FO UG CONV	8200	LF	292	2394400	271	2,222,200	563.00	4,616,600
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	8200	LF	33	270600	114	934,800	147.00	1,205,400
SECONDARY SERVICE OR SMALL LATERAL	20	EA	15000	300000	10000	200,000	25,000.00	500,000
TEL SERVICE OR SMALL CROSSING	20	EA	12000	240000	10000	200,000	22,000.00	440,000
CATV SERVICE FOR SMALL CROSSING	20	EA	12000	240000	10000	200,000	22,000.00	440,000
								39,187,939

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Queen Street from Sta 1434 to Piikoi

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE RELOCATION	200	LF	2,296	459,200	1,208	241,500	3,504	700,700
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV	600	LF	1,312	787,200	690	414,000	2,002	1,201,200
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	2	EA	193,920	387,840	121,359	242,718	315,279	630,558
4 KV OR 12 KV OH TO UG CONVER	2800	LF	648	1,814,400	340	952,000	988	2,766,400
SEC OH TO UG CROSSING	10	EA	33,268	332,680	34,384	343,840	67,652	676,520
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	5	EA	65,460	327300	33,856	169,280	99,316.00	496,580
1 PHASE TRANSFORMER	7	EA	45,466	318262	26,392	184,744	71,858.00	503,006
TEL CABLE - CU & FO TRANSVERSE CROSS	6	EA	100,540	603240	112,628	675,768	213,168.00	1,279,008
TEL CABLE - CU & FO UG CONV	2000	LF	402	804000	451	902,000	853.00	1,706,000
CATV - COAX & FO CROSS	6	EA	73,109	438654	67,777	406,662	140,886.00	845,316
CATV COAX & FO UG CONV	2000	LF	292	584000	271	542,000	563.00	1,126,000
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	2000	LF	33	66000	114	228,000	147.00	294,000
SECONDARY SERVICE OR SMALL LATERAL	10	EA	15000	150000	10000	100,000	25,000.00	250,000
TEL SERVICE OR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
CATV SERVICE FOR SMALL CROSSING	10	EA	12000	120000	10000	100,000	22,000.00	220,000
								12,915,288

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Nimitz from Nuuanu to Halekauwila to Sta 1434

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION		EA	363,730		200,341		564,071	
46 KV RELOCATION OR OH-UG CONV	7200	LF	1,312	9,446,400	690	4,968,000	2,002	14,414,400
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	26	EA	193,920	5,041,920	121,359	3,155,334	315,279	8,197,254
4 KV OR 12 KV OH TO UG CONVER	16600	LF	648	10,756,800	340	5,644,000	988	16,400,800
SEC OH TO UG CROSSING	20	EA	33,268	665,360	34,384	687,680	67,652	1,353,040
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER	5	EA	65,460	327300	33,856	169,280	99,316.00	496,580
1 PHASE TRANSFORMER	4	EA	45,466	181864	26,392	105,568	71,858.00	287,432
TEL CABLE - CU & FO TRANSVERSE CROSS	15	EA	100,540	1508100	112,628	1,689,420	213,168.00	3,197,520
TEL CABLE - CU & FO UG CONV	6000	LF	402	2412000	451	2,706,000	853.00	5,118,000
CATV - COAX & FO CROSS	15	EA	73,109	1096635	67,777	1,016,655	140,886.00	2,113,290
CATV COAX & FO UG CONV	5200	LF	292	1518400	271	1,409,200	563.00	2,927,600
STREETLIGHT CONVERSION- PER LF - DECORATIVE FIXTURE		LF	90		114		204.00	
STREET LIGHT CONVERSION - COBRA HEAD	6800	LF	33	224400	114	775,200	147.00	999,600
SECONDARY SERVICE OR SMALL LATERAL	20	EA	15000	300000	10000	200,000	25,000.00	500,000
TEL SERVICE OR SMALL CROSSING	20	EA	12000	240000	10000	200,000	22,000.00	440,000
CATV SERVICE FOR SMALL CROSSING	20	EA	12000	240000	10000	200,000	22,000.00	440,000
								56,885,516

MK ENGINEERS, LTD.

OPINION OF PROBABLE CONSTRUCTION COST:

CLIENT : PARSONS BRINCKERHOFF, QUADE AND DOUGLAS

PROJECT : HONOLULU RAPID TRANSIT ALTERNATIVES ASSESSMENT

LOCATION : Waikiki Spur

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENG. ESTIMATE	
	NO.	UNIT	U/C	COST	U/C	COST	U/C	COST
138 KV TRANSVERSE CROSSING		EA	545,595		300,512		846,107	
46 KV TRANSVERSE CROSSING CONVERSION	3	EA	363,730	1,091,190	200,341	601,023	564,071	1,692,213
46 KV RELOCATION OR OH-UG CONV		LF	1,312		690		2,002	
4 OR 12 KV PRI OH TO UG TRANSVERSE CROSSING	53	EA	193,920	10,277,760	121,359	6,432,027	315,279	16,709,787
4 KV OR 12 KV OH TO UG CONVER	26200	LF	648	16,977,600	340	8,908,000	988	25,885,600
SEC OH TO UG CROSSING		EA	33,268		34,384		67,652	
SEC OH TO UG CONVERSION 400A		LF	222		229		451.00	
3 PHASE TRANSFORMER		EA	65,460		33,856		99,316.00	
1 PHASE TRANSFORMER		EA	45,466		26,392		71,858.00	
TEL CABLE - CU & FO TRANSVERSE CROSS	23	EA	100,540	2312420	112,628	2,590,444	213,168.00	4,902,864
TEL CABLE - CU & FO UG CONV	17800	LF	402	7155600	451	8,027,800	853.00	15,183,400
CATV - COAX & FO CROSS	23	EA	73,109	1681507	67,777	1,558,871	140,886.00	3,240,378
CATV COAX & FO UG CONV	8900	LF	292	2598800	271	2,411,900	563.00	5,010,700
STREETLIGHT CONVERSION-PER LF - DECORATIVE FIXTURE	8900	LF	90	801000	114	1,014,600	204.00	1,815,600
STREET LIGHT CONVERSION - COBRA HEAD		LF	33		114		147.00	
SECONDARY SERVICE OR SMALL LATERAL	15	EA	15000	225000	10000	150,000	25,000.00	375,000
TEL SERVICE OR SMALL CROSSING	15	EA	12000	180000	10000	150,000	22,000.00	330,000
CATV SERVICE FOR SMALL CROSSING	15	EA	12000	180000	10000	150,000	22,000.00	330,000
								75,475,542